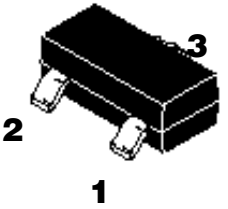
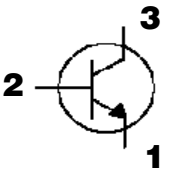
Semiconductor *Data Sheet*

NPN Switching Transistor

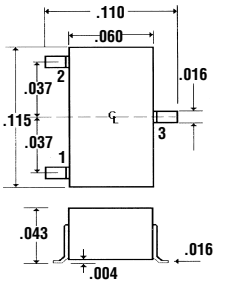
FMBT4401

Description





Mechanical Dimensions



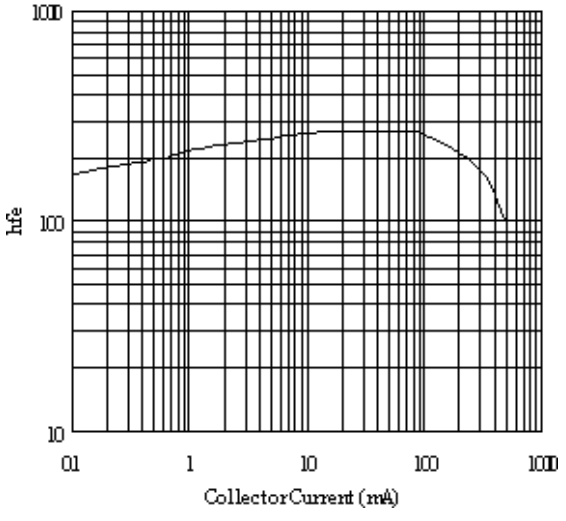
Maximum Ratings

Ratings	Symbol	Value	Units
Collector - Emitter Voltage	V_{CEO}	40	V
Collector - Base Voltage	V_{CBO}	60	V
Emitter - Base Voltage	V_{EBO}	6.0	V
Collector Current (Continuous)	I_C	600	mA
Total Device Dissipation FR-5 Board (Note1) T_A = 25°C	P_D	350	mW
Junction and Storage Temperature	T_J, T_{STG}	-55 to 150	°C

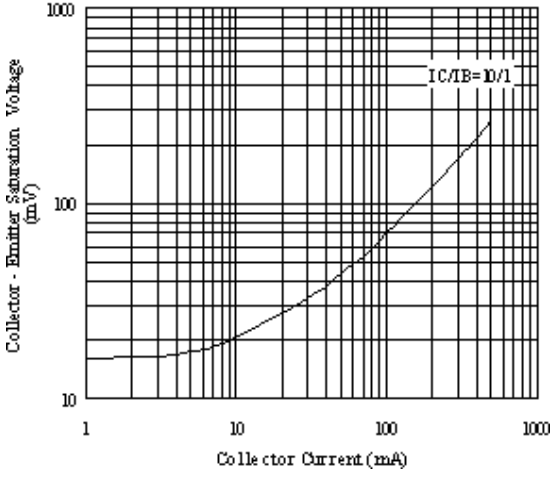
Electrical Characteristics @ 25°C

Characteristic	Symbol	Min	Max	Unit
Collector - Emitter Breakdown Voltage (I_C = 1.0mA)	$V_{BR(CEO)}$	40	---	V
Collector - Base Breakdown Voltage (I_C = 0.1mA)	$V_{BR(CBO)}$	60	---	V
Emitter - Base Breakdown Voltage (I_E = 0.01mA)	$V_{BR(EBO)}$	6.0	---	V
Collector Cutoff Current (V_{CE} = 35V, V_{EB} = -0.4V)	I_{CEX}	---	0.1	µA
DC Current Gain	H_{FE}			---
(I_C = 0.1 mA, V_{CE} = 1.0 V)		20	---	
(I_C = 1.0 mA, V_{CE} = 1.0 V)		40	---	
(I_C = 10 mA, V_{CE} = 1.0 V)		80	---	
(I_C = 150 mA, V_{CE} = 1.0 V)		100	300	
(I_C = 500 mA, V_{CE} = 2.0 V)		40	---	
Collector - Emitter Saturation Voltage (Note 3)	$V_{CE(sat)}$			Vdc
(I_C = 150 mA, I_B = 15 mA)		---	0.4	
(I_C = 500 mA, I_B = 50 mA)		---	0.75	
Base - Emitter Saturation Voltage (Note 3)	$V_{BE(sat)}$			Vdc
(I_C = 150 mA, I_B = 15 mA)		---	0.95	
(I_C = 500 mA, I_B = 50 mA)		---	1.2	
Current - Gain - Bandwidth Product (I_C = 20 mA, V_{CE} = 10 V, f = 100 MHz)	f_T	250	---	MHz
Collector-Base Capacitance (V_{CB} = 5 V, I_E = 0, f = 1.0 MHz)	C_{cb}	---	6.5	pF

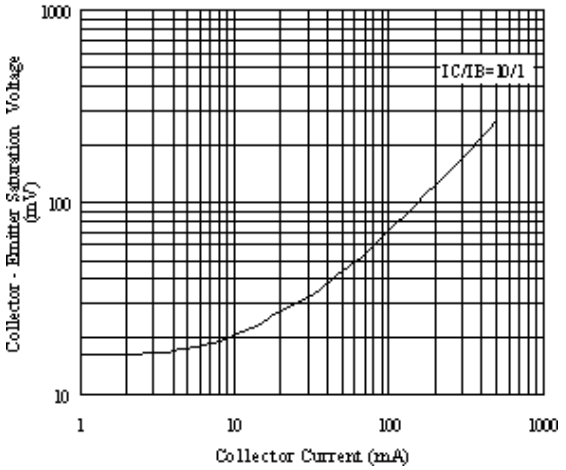
DC CURRENT GAIN



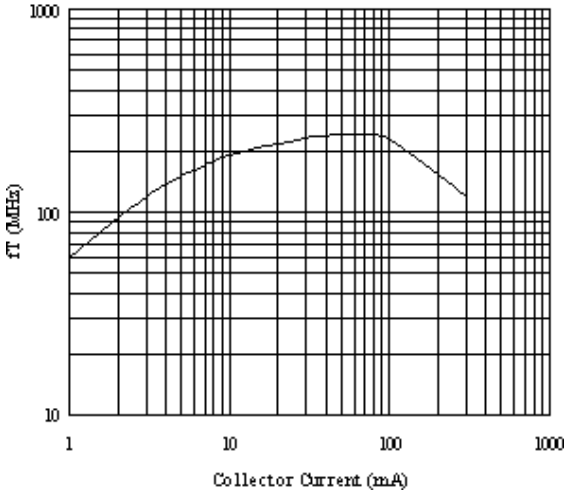
COLLECTOR TO EMITTER SATURATION VOLTAGE



COLLECTOR TO EMITTER SATURATION VOLTAGE



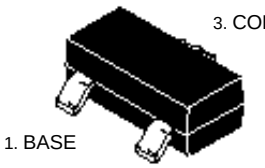
CURRENT GAIN-BANDWIDTH PRODUCT



Data Sheet

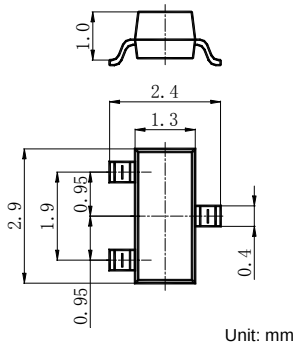
FMMT591 PNP TRANSISTOR

Description



SOT-23

Mechanical Dimensions



Unit: mm

FEATURES

Power dissipation

P_{CM}: 0.5 W (Tamb=25℃)

Collector current

I_{CM}: -1 A

Collector-base voltage

$V_{(BR)CBO}$: -80 V

Operating and storage junction temperature range

T_J, T_{stg}: -55℃ to +150℃

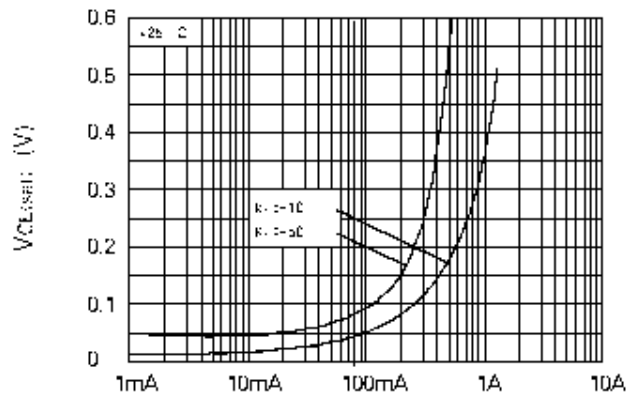
MARKING:591

ELECTRICAL CHARACTERISTICS (Tamb=25℃ unless otherwise specified)

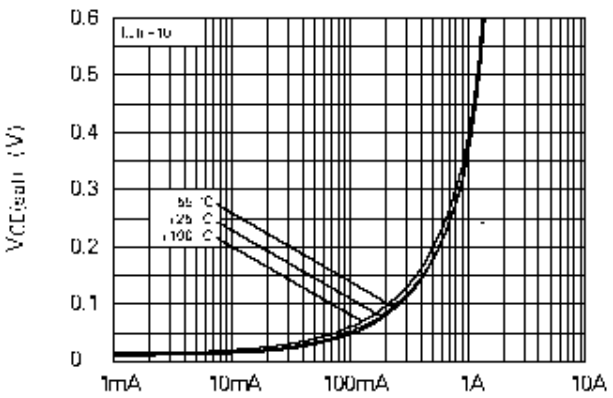
Parameter	Symbol	Test conditions	MIN	TYP	MAX	UNIT
Collector-base breakdown voltage	$V_{(BR)CBO}$	Ic=-100μA, I_E=0	-80			V
Collector-emitter breakdown voltage	$V_{(BR)CEO}$[1]	Ic=-10mA, I_B=0	-60			V
Emitter-base breakdown voltage	$V_{(BR)EBO}$	I_E=-100μA, I_C=0	-5			V
Collector cut-off current	I_{CBO}	V_{CB}=-60V, I_E=0			-0.1	μA
Emitter cut-off current	I_{EBO}	V_{EB}=-4V, I_C=0			-0.1	μA
DC current gain	$h_{FE(1)}$	V_{CE}=-5V, I_C=-1mA	100			
	$h_{FE(2)}$[1]	V_{CE}=-5V, I_C=-500mA	100		300	
	$h_{FE(3)}$[1]	V_{CE}=-5V, I_C=-1A	80			
	$h_{FE(4)}$[1]	V_{CE}=-5V, I_C=-2A	15			
Collector-emitter saturation voltage	$V_{CE(sat)1}$[1]	I_C=-500mA, I_B=-50mA			-0.3	V
	$V_{CE(sat)2}$[1]	I_C=-1A, I_B=-100mA			-0.6	V
Base-emitter saturation voltage	$V_{BE(sat)}$[1]	I_C=-1A, I_B=-100mA			-1.2	V
Base-emitter voltage	V_{BE}[1]	V_{CE}=-5V, I_C=-1A			-1	V
Transition frequency	f_T	V_{CE}=-10V,I_C=-50mA,,f=100MHz	150			MHz
Collector output capacitance	C_{ob}	V_{CB}=-10V,f=1MHz			10	pF

[1]Measured under pulsed conditions, Pulse width=300μs, Duty cycle≤2%.

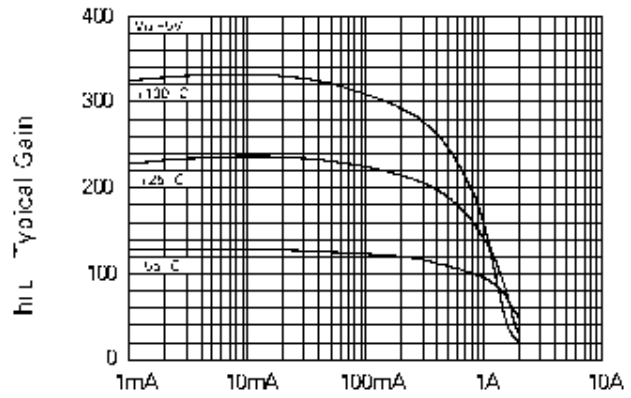
Typical Characteristics



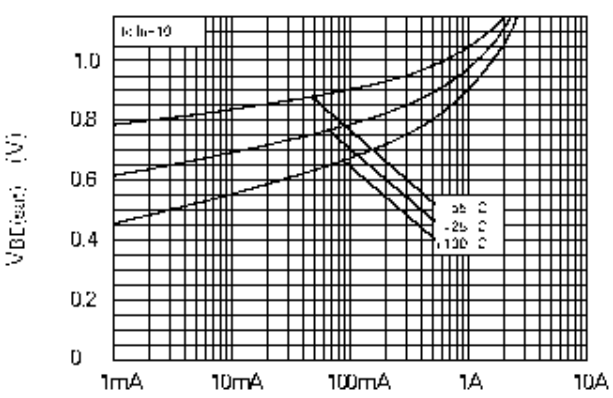
VCE(sat) v IC



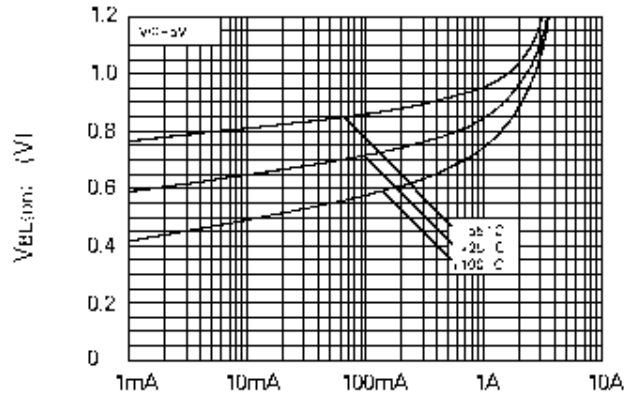
VCE(sat) v IC



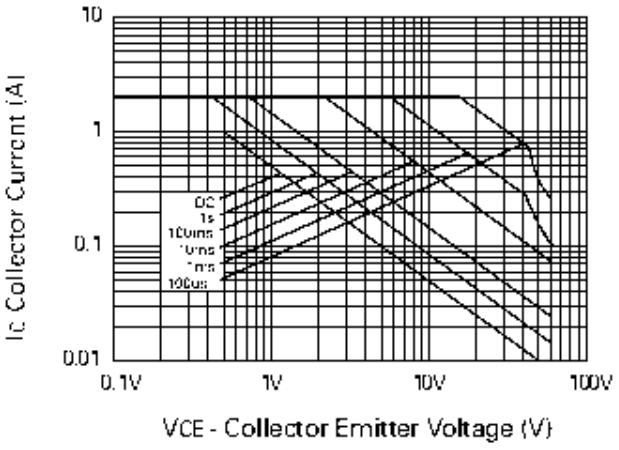
hFE V IC



VBE(sat) v IC



VBE(on) v IC



Safe Operating Area